REMARKS

In reply to the Office Action of October 16, 2007, Applicants have amended claims 1 and 9, and added new claims 21-40. No claims have been canceled. Accordingly, claims 1-40 are pending, with claims 1, 9, 24, and 40 in independent form.

Claims 1, 4-6, 9, 15, and 18-20 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Roberts et al. (U.S. Patent No. 6,521,916, "Roberts"). Claims 2, 7, 8, 11, 13, and 16 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Roberts. Claims 3, 10, 12, 14, and 17 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Roberts in view of Narita (U.S. Patent No. 6,144,107, "Narita").

Without conceding the merits of the rejection of claim 1, but to expedite prosecution, Applicants have amended claim 1 in this reply to cover radiation-emitting and/or –receiving semiconductor components that include, in part, a molded plastic body "made of a silicone molding compound," and a semiconductor chip "mounted on a flexible lead frame." Neither Roberts nor Narita discloses or suggests the semiconductor components covered by amended claim 1, for at least the following reasons.

First, Roberts fails to disclose a molded plastic body that "is made of a silicone molding compound," as required by claim 1. The Action identifies glob-top 40 and/or zone 30 as corresponding to the claimed molded plastic body (Action at page 2). Roberts discloses that glob-top 40 can be formed from "silicone or silastic" (Roberts, col. 14, line 49). However, glob-top 40 is not formed from a silicone *molding compound* as required by claim 1. Instead, Roberts states that glob-top 40 is "deposited over radiation emitter 35" (Roberts, col. 14, lines 47-48). Roberts further describes the deposition of glob-top 40, stating that the glob-top is "preapplied to radiation emitter 35 *prior to the first stage of molding* of the encapsulant" (Roberts, col. 15, lines 37-38, emphasis added). In other words, glob-top 40 is not formed of a molding compound as required by claim 1; instead, glob-top 40 is formed prior to any molding process occurring in Roberts' assembly procedure, and is therefore not formed of a molding compound.

Moreover, zone 30 is not formed from a silicone molding compound. Instead, Roberts discloses that zone 30 is formed during a "first stage of encapsulation whereby a clear epoxy lens material is dispensed (preferably by injection) into encapsulant mold cavity 62" (Roberts, col. 18, lines 11-14). That is, zone 30 is formed from an epoxy material, not a silicone molding compound. Applicants can find no disclosure or suggestion in Roberts that relates to forming zone 30 from a silicone molding compound.

Second, Roberts fails to disclose a semiconductor chip mounted on a flexible lead frame, as required by claim 1. Roberts discloses merely that "[l]ead frame 52 is preferably made of metal" (Roberts, col. 17, line 17). However, Applicants can find no disclosure in Roberts that relates to flexible lead frames, nor does Roberts provide any reason why a person of skill in the art would have modified Roberts' radiation emitters to include a flexible lead frame.

Narita does not cure Roberts' deficiencies with regard to claim 1. In particular, Narita does not disclose or suggest semiconductor components that include a "molded plastic body ... made of a silicone molding compound," as required by claim 1. While Narita does disclose that covering member 5 can be formed of transparent "silicone resin" (Narita, col. 5, line 24), Narita does not disclose forming covering member 5 in a molding process, and therefore, Narita fails to disclose a covering member formed of a silicone molding compound. Instead, Narita states that the silicone compound is "dispensed from the dispenser over the CCD chip 3" (Narita, col. 6, lines 49-50), after which the assembly is "put into a homoiothermic tank" (Narita, col. 6, lines 55-56). Narita states that "[a]fter the lead frame 1 with the CCD chip 3 mounted thereon and covered with the compound is put in the tank for 1 or 2 hour, the covering member 5 ... is thus set or cured" (Narita, col. 6, lines 58-60). In other words, covering member 5 is not formed via a molding process, but is instead formed in a type of deposition process of a resin compound.

Furthermore, Narita does not disclose or suggest semiconductor components that include a semiconductor chip "mounted on a flexible lead frame," as required by claim 1. Instead, Narita discloses that lead frame 1 is formed from "a sheet made of copper alloy" (Narita, col. 6, lines 16-17), which is "pressed into a form shown in FIG. 4" (Narita, col. 6, lines 18-19). Applicants

can find no disclosure in Narita that relates to flexible lead frames, and Narita provides no reason why one of skill in the art would use flexible lead frames in his semiconductor components.

Accordingly, Applicants believe that claim 1 is patentable over Roberts and Narita, taken alone or in combination, and Applicants therefore respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 102(b).

Independent claim 9 has been amended in this reply to cover methods that include attaching a semiconductor chip to "a metallic lead frame, a carrier substrate or flexible lead frame." The methods covered by claim 9 also include a step in which "silicone molding compound is injected into the cavity via an injection molding process or a transfer molding process." The methods of claim 9 are neither disclosed nor suggested by either Roberts or Narita, for at least the following reasons.

Roberts does not disclose molding processes that involve a silicone molding compound. In Roberts' radiation emitters, as discussed above, glob-top 40 can be formed of a silicone or silastic material. However, the formation of glob-top 40 occurs "prior to the first stage of molding of the encapsulant" (Roberts, col. 15, lines 38-39). Moreover, Roberts does not disclose that either zone 30 or zone 32 can be formed from a silicone molding compound that is "injected into the cavity via an injection molding process or a transfer molding process," as required by claim 9. Instead, zones 30 and/or 32 are formed of an epoxy material rather than a silicone material. Roberts states that "[f]irst zone 30 of encapsulant 12 is preferably made of a composition comprising an optical epoxy mixture that is substantially transparent to the radiation emitted by radiation emitter 35 ... [h]owever, other clear materials may also be used" (Roberts, col. 15, lines 44-47).

Roberts further describes the process of forming zones 30 and 32, stating that "[t]he next step (114) is to perform the first stage of encapsulation whereby a clear epoxy lens material is dispensed (preferably by injection) into encapsulant mold cavity 62" (Roberts, col. 18, lines 11-14). In other words, in Roberts' process, it is an epoxy material that is molded to form zone 30, not a silicone molding compound. There is simply no disclosure in Roberts that relates to the use of a silicone molding compound, as required by claim 9, and Roberts provides no reason or

suggestion as to why a person of skill in the art would use silicone compounds to form Roberts' devices.

Moreover, it is not even clear that Roberts injects his epoxy into mold cavity 62 via "an injection molding process or a transfer molding process," as required by claim 9. Injection molding and transfer molding typically make use of a mold which is closed apart from an injection channel for a molding compound. The mold is filled with molding compound by injection through the injection channel under relatively high pressure. In contrast, Roberts' mold cavity 62 appears to be open (see, e.g., Figs. 5-7 of Roberts), and epoxy is dispensed into the mold cavity through the openings. This process does not correspond to the injection molding process or transfer molding process required by claim 9.

Narita does not cure Roberts' deficiencies with regard to claim 9. Narita's pickup devices include a covering member 5 that can be formed of silicone resin, and a solid package 6 which "is transparent and is formed by the transfer-molding" (Narita, col. 5, lines 34-35). As discussed above, while covering member 5 can include silicone, covering member 5 is not formed by an injection molding process or a transfer molding process. Instead, covering member 5 is formed in a type of resin deposition and curing process. There is no disclosure in Narita that relates to forming covering member 5 via injection molding or transfer molding, and it is not even clear that a molding process would be possible with Narita's silicone resin, given that the resin "is elastic, flexible, or sticky like gum or jelly" (Narita, col. 5, lines 20-21).

Narita's solid package 6 can be formed by transfer molding. However, Narita states that solid package 6 is formed of a resin that "consists essentially of epoxy resin of epi-bis- or bis-epi-type such as bisphenol-epichorohydrin epoxy resin as main agent" (Narita, col. 6, lines 65-67). In other words, Narita's solid package is not formed from a silicone molding compound, but from epoxy resin. To the best of Applicants' knowledge, Narita includes no disclosure or suggestion that relates to forming package 6 from a "silicone molding compound [that] is injected into the cavity via an injection molding process or a transfer molding process," as required by claim 9.

Accordingly, Applicants submit that claim 9 is patentable over both Roberts and Narita, taken alone or in combination, and Applicants therefore respectfully request reconsideration and withdrawal of the rejection of claim 9 under 35 U.S.C. § 102(b).

Claims 2-8 and 10-20 depend from one of claims 1 and 9, and are therefore patentable for at least the same reasons. In addition, Applicants wish to specifically comment upon dependent claims 3 and 10.

Claims 3 and 10 cover semiconductor components in which the "silicone molding compound has a hardness when cured of 65 Shore D or more." The Action acknowledges that Roberts does not disclose such components, but states that "Narita teaches a silicone molding compound having a hardness when cured of 65 Shore D or more (column 5, lines 36-40)" (Action at page 8). However, the cited portion of Narita relates to solid package 6 which, as discussed above, is not formed of a silicone molding compound, but is instead formed of epoxy resin. Furthermore, Narita's covering member 5, which is formed from a silicone compound, is flexible even when cured. Although Narita does not provide a Shore D hardness of covering member 5, Narita states that covering member 5 "has flexibility with Shore-A hardness 0" (Narita, col. 6, lines 60-61). In other words, Narita provides no disclosure that relates to a silicone molding compound with a hardness when cured of 65 Shore D or more, and in view of the flexibility of Narita's covering member 5, it is unlikely that covering member 5 has the claimed Shore D hardness. In view of Narita's description of covering member 5, it cannot therefore be fairly stated that Narita discloses the semiconductor components covered by claims 3 and 10.

In view of each of the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the rejections of dependent claims 2-8 and 10-20.

In this reply, new claims 21-40 have been added, with claims 24 and 40 in independent form. New independent claim 24 covers radiation-emitting and/or –receiving semiconductor components in which "the molded plastic body is made of a silicone molding compound," and in which "the external electrical leads each comprise S-shaped bends that extend from a chip-mounting region to a mounting surface of the semiconductor component, the S-shaped bends

being enclosed within the molded plastic body and positioned so that portions of the electrical leads extend outward from two opposite side faces of the molded plastic body." The subject matter of claim 24 is disclosed, for example, in the application at: page 5, third paragraph and fifth paragraph; page 6, second paragraph; Figure 1; and in originally-filed claim 1.

As discussed above in connection with claim 1, neither Roberts nor Narita discloses components with a molded plastic body "made of a silicone molding compound," as required by claim 24. Furthermore, neither Roberts nor Narita discloses components having external electrical leads with S-shaped bends "enclosed within the molded plastic body," as required by claim 24. To the contrary, Roberts' components generally do not include electrical leads with S-shaped bends at all. To the extent that Roberts discloses bent electrical leads (see, for example, Fig. 15 of Roberts), the bent portions of the electrical leads are not enclosed within the molded plastic body of Roberts' devices.

Similarly, Narita states explicitly that "[p]ortions of the terminal-lines 1b and 1c sticking out from the solid package 6 are bent into prescribed forms" (Narita, col. 7, lines 12-13). In other words, Narita's electrical leads may have bends, but the bends are not enclosed within the molded plastic body (e.g., Narita's solid package 6).

Accordingly, for all of the above reasons, Applicants submit that new claim 24 is patentable over both Roberts and Narita, taken alone or in combination. Applicants therefore respectfully request allowance of claim 24.

New independent claim 40 covers radiation-emitting and/or –receiving semiconductor components that include, in part, a "molded plastic body [that] is made of a silicone molding compound," and a semiconductor chip that is "mounted on a flexible lead frame that comprises a plastic material." The subject matter of claim 40 is disclosed in the application at, for example: page 7, second and third paragraphs; Figure 3; and in originally-filed claim 1.

As discussed above in connection with claim 1, neither Roberts nor Narita discloses components with a molded plastic body made of a silicone molding compound, and neither Roberts nor Narita discloses a semiconductor chip that is mounted on a flexible lead frame. Furthermore, neither Roberts nor Narita discloses a lead frame that includes a plastic material.

Instead, Roberts states that "[l]ead frame 52 is preferably made of metal" (Roberts, col. 17, line 17). Narita states that his lead frame is "made of copper alloy between 0.15 and 0.25 mm in thickness" (Narita, col. 6, lines 17-18) and "plated with a noble metal such as gold, silver, palladium, or rhodium" (Narita, col. 6, lines 19-20). There is simply no disclosure or suggestion in either Roberts or Narita that relates to a lead frame "that comprises a plastic material," as required by claim 40.

Accordingly, for all of the above reasons, Applicants submit that new claim 40 is patentable over both Roberts and Narita, taken alone or in combination. Applicants therefore respectfully request allowance of claim 40.

New dependent claims 21-23 and 25-39 have also been added in this reply. The subject matter of these claims is disclosed in the application at, for example: page 5, paragraphs 3-5; page 6, paragraphs 1-4; page 7, paragraphs 2-5; Figures 1-3; and in the originally-filed claims.

Claims 21-23 and 25-39 depend from one of claims 1, 9, and 24, and are therefore patentable for at least the same reasons. Accordingly, Applicants respectfully request allowance of claims 21-23 and 25-39.

In view of the foregoing, Applicants ask that the application be allowed.

Canceled claims, if any, have been canceled without prejudice or disclaimer. Any circumstance in which Applicants have: (a) addressed certain comments of the Examiner does not mean that Applicants concede other comments of the Examiner; (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or (c) amended or canceled a claim does not mean that Applicants concede any of the Examiner's positions with respect to that claim or other claims.

Fees for excess claims and the Petition for extension of time are being paid concurrently via Deposit Account authorization. Please apply any other charges or credits to deposit account 06-1050, referencing 12406-187US1.

Respectfully submitted,

Date: 4/16/08

Marc M. Wefers, Ph.D., J.D.
Reg. No. 56,842

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110
Telephone: (617) 542-5070
Facsimile: (617) 542-8906

21902207.doc